

Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed**1.1. Name of the Data, data collection Project, or data-producing Program:**

Biogeographic Characterization of Benthic Composition within the Flower Garden Banks National Marine Sanctuary (2006 - 2007)

1.2. Summary description of the data:

The overarching goal of this collaboration was to provide the Flower Garden Banks National Marine Sanctuary (FGBNMS) staff with information on biogeographic patterns within the Sanctuary. This specific project focused on the development of a plan to spatially and quantitatively characterize the fish communities in relatively shallow waters throughout the Sanctuary (less than 110 ft). This collaboration also included the initial implementation of that plan. The FGBNMS represents the northernmost tropical western Atlantic coral reef on the continental shelf and support the most highly developed offshore hard bank community in the region. The complexity of habitats supports a diverse assemblage of organisms including approximately 250 species of fish, 23 species of coral, and 80 species of algae in addition to large sponge communities. Understanding and monitoring these resources is critical to both sanctuary inventory and management activities. Monitoring of the biological communities has taken place at FGBNMS since the 1970s. This work has focused primarily on monitoring the benthos with video transects and photostations documenting transitions between coral, algae and sponge communities over time. Until relatively recently, little has been done to monitor or characterize the reef fish community. In 1994 the Reef Environmental Education Foundation (REEF) began surveys of the Sanctuary and utilized a combination of REEF personnel, volunteers, and Sanctuary staff to visually census reef fish populations via roving diver surveys. These surveys have been invaluable in terms of species list development and understanding the ranges of these species. Subsequently, a stationary point-count survey technique was utilized to begin to quantify community metrics such as species abundance and trophic structure at selected locations. These data provide an important starting point for characterizing the fish community; however, they are limited in scope of inference to small portions of the Sanctuary coral cap environment and are therefore difficult to utilize in developing population estimates at the scale of the Sanctuary.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2006-09 to 2007-09

1.5. Actual or planned geographic coverage of the data:

W: -93.82, E: -93.59, N: 27.92, S: 27.87

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

1.7. Data collection method(s):

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:**1.8.1. If data are from another observing system, please specify:****2. Point of Contact for this Data Management Plan (author or maintainer)****2.1. Name:**

NCCOS Scientific Data Coordinator

2.2. Title:

Metadata Contact

2.3. Affiliation or facility:**2.4. E-mail address:**

NCCOS.data@noaa.gov

2.5. Phone number:**3. Responsible Party for Data Management**

Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

NCCOS Scientific Data Coordinator

3.2. Title:

Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- 2007-09-01 00:00:00 - A stratified random sampling design was employed to sample fish on the coral cap communities of the East and West Flower Garden Banks. The survey domain at each coral cap was designated as all areas shallower than 110 feet below sea level. Fine-scale (0.5 m) bathymetric data provided by the Flower Garden Banks National Marine Sanctuary was used to ascertain depths and slope. In 2006, the survey domain was partitioned into flat/gentle sloping (0-30 degrees) and steep sloping (>30 degrees) area and into East and West Banks. A continuous surface of slope estimates was produced for each Bank using a nearest neighbor filter on an aggregated resolution (5m X 5m) bathymetric grid derived from the original bathymetric dataset in ArcGIS (ESRI, 2006). The combination of two slope and two location groupings resulted in four strata. Survey sites were then randomly positioned in each stratum in ArcGIS (ESRI, 2006). Data were collected using 100m² transects. Transects radiated from each point at a random bearing. In 2007, a sample frame consisting of mutually-exclusive 50m X 50m grid cells was produced and overlaid on each coral cap to exhaustively cover all diveable areas (i.e less than 110ft). Each grid cell was considered a sample unit and units were divided into six strata. Strata were defined using benthic habitat, location and depth. High (dominated by plate and head corals) and low relief (dominated by Madracis and rubble) coral categories were determined using a benthic habitat map generated by visual interpretation of multibeam data. Units were divided into deep (>105 ft) and shallow (less than 105 ft) groups based on the location of sampling unit centroids on multibeam bathymetric models. Location and high relief coral categories were divided by depth, low relief coral was not. Data were collected within 100m² transects. Transects radiated from the centroid of each sample unit at a random bearing. Once in the field, the boat captain navigated to previously selected sites using a handheld GPS unit. On-site, divers were deployed and maintained contact with each other throughout the entire census. One diver was responsible for

collecting data on benthic composition. This diver followed the belt-transect diver and recorded data on small-scale benthic habitat composition and structure within a 1m² quadrat divided into 100 (10 x 10cm) squares at 4 separate positions along the transect. Each position was randomly chosen before entering the water such that there was one random point within every 6m interval along the transect. Percent cover was obtained as if looking at the quadrat in a two dimensional plane (i.e. a photograph) vs. three dimensions where percent cover could add up to greater than 100%. To estimate percent cover, the diver first positioned the quadrat at the chosen meter mark along a randomly chosen side of the transect tape. The remaining quadrats were placed on alternating sides of the transect at the last three locations. Data were collected on the following: 1) Logistic information - diver name, dive buddy, date, time of survey, site code, and meter numbers at which the quadrat is placed. 2) Habitat structure - In 2006, to characterize the benthic habitats of the dive site, the habitat diver first categorizes the habitat structure of the site (head corals, plate corals or Madracis-dominated). The habitat category to which a site is assigned should be made independently of the map so that in-situ data can be used for map validation. (continued)

- 2007-09-01 00:00:00 - (continued from above) In 2007, to characterize the benthic habitats of the dive site, the habitat diver identified the percentage of high- and low relief coral structure within a 25m radius circle of the centroid of the sampling unit.

3) Transect depth profile - the depth at each quadrat position. Depth is measured with a digital depth gauge to the nearest 1ft. 4) Abiotic footprint - defined as the percent cover (to the nearest 1%) of sand, rubble, hard bottom, fine sediments, and other non-living bottom types within a 1m² quadrat. Rubble refers to rocks and coral fragments that are moveable; immovable rocks are considered hard bottom. The percent cover given as a part of the abiotic footprint should total 100%. In a hard coral area for example, despite the fact that living hard corals may provide 50% cover the underlying substrate is 100% hard substrate so this is what is recorded. The diver then estimates the height (in centimeters) of the hardbottom within each quadrat from the substrate to get a sense of bottom relief. 5) Biotic footprint - defined as the percent cover (to the nearest 0.1%) of macroalgae, live corals, sponges, gorgonians, and other biota (tunicates, anemones, zooanthids and hydroids) within a 1m² quadrat. The remaining cover is recorded as bare substrate to bring the total to 100%. Again, the diver must use a planar view to estimate percent cover of the biota. Species covering less than 0.1% of the area are not recorded. Taxa are identified to the following levels: stony coral-species, algae-morphological group (macro, turf, crustose), sponge-morphological group, and gorgonians-morphological group. For stony corals, the approximate area covered by living coral tissue is recorded. Coral skeleton (without living tissue) is usually categorized as turf algae or uncolonized substrate. Data on the condition of coral colonies are also recorded. When coral is noticeably bleached, the entire colony is considered affected and is recorded to the nearest 0.1%. Diseased/dead coral refers to coral skeleton that has recently lost living tissue because of disease or damage, and has not yet been colonized by turf algae. Turf algae include a mix of short (less

than 1cm high) algae that colonize dead coral substrate. 6) Maximum canopy height - for each soft biota type (e.g., gorgonians, sponges-except encrusting form, algae), maximum height is recorded to the nearest 1cm. 7) Abundance of queen conchs (*Strombus gigas*) - conch encountered within the 25m x 4m belt transect are enumerated. 8) Abundance of spiny lobsters (*Pan ulirus argus*) - a count of the total number of lobsters encountered within the 25m x 4m belt transect. 9) Abundance of long-spined urchin (*Diadema antillarum*) - a count of the total number of urchins encountered within the 25m x 4m belt transect. 10) Photos - 2 photos are taken in opposite directions at each location to document the surrounding habitat. Additional photos may be taken to document disease, bleaching or other events of note. 11) Marine debris - type of marine debris within the transect is noted. The size of the marine debris and area of habitat that it is affecting is also recorded along with a note identifying any flora or fauna that has colonized it. Data caveats: The mission in 2007 was aborted early due to Hurricane Humberto (September 2007). No sites were surveyed on the West Bank and only a subset of the sample of random sites selected on the East Bank were surveyed. Randomly selected sites on the East Bank were not sampled randomly. These data should not be aggregated to make synoptic population or community estimates for the East Bank. (end continuation)

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:

- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?

- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.2. Name of organization of facility providing data access
 - 7.2.1. If data hosting service is needed, please indicate
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:**6.3. URL of metadata folder or data catalog, if known:**

<https://www.fisheries.noaa.gov/inport/item/39313>

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:**7.2.1. If data hosting service is needed, please indicate:**

7.2.2. URL of data access service, if known:**7.3. Data access methods or services offered:**

Please contact the Flower Garden Banks NMSP Science Coordinator for additional information on data access (FGBScience.Coordinator@noaa.gov);

7.4. Approximate delay between data collection and dissemination:**7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:****8. Data Preservation and Protection**

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:**8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:****8.2. Data storage facility prior to being sent to an archive facility (if any):**

National Centers for Coastal Ocean Science - Silver Spring, MD

8.3. Approximate delay between data collection and submission to an archive facility:**8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?**

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.